

ges to B) when a Brass Weight, such as C, has been screwed on, to the Bottom at c. There are a great many such Weights of different Sizes, and marked to be screwed on, instead of C, for Liquors that differ more than $\frac{1}{10}$ from Proof, so as to serve for the specifick Gravities in all such Proportions as relate to the Mixture of spirituous Liquors, in all the Variety made Use of in Trade. There are also other Balls for shewing the specifick Gravities quite to common Water, which makes the Instrument perfect in its Kind.

VII. *An Account of an Aurora Borealis attended with unusual Appearances, in a Letter from the Learned Mr. G. Cramer, Prof. Math. Genev. to James Jurin, M. D. and F. R. S.*

I Have been so overcharged with Business since I came here, that I had hardly Time enough to think of writing.

Being now a little more at Leisure, I would not miss the Occasion of an *Aurora Borealis*, which appeared here the 15th of Feb. N. S. accompanied with some Circumstances rare enough to be worth your Consideration.

The *Aurora* it self had nothing extraordinary ; it was a quiet one, that is, without any sensible Motion, except, perhaps, an alternative Increase and Diminution of apparent Altitude. Whether it was for this Reason, or because the Light had its Edge imperceptibly confounded with the Colour of Heaven, several People judged of that Altitude severally. There are some that

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that pretend to have seen it to the very Zenith : I was not so happy, and could not see it higher than the Girdle (β) of *Cephus*, which was about 30 Deg. high. The greatest Part did fix it to the Polar Star, which is about 46 Deg. Its Base reached from the Head of *Andromeda* and further, to the Shoulder (γ) of *Bootes*, and further, and so it did insist upon an Arch of 140 or 150 Deg. of the Horizon. This Measure was taken half an Hour after Eight. Its Middle declined from North to West about 15 Deg. The Light was still, and clear enough to read a Character no bigger than that of this Letter. The Base has seemed obscure to some People.

But what was chiefly to be considered, was a great Meridional Zone pretty like a Rainbow in its Figure, but broader. It was terminated by two parallel Arches. The superior insisted with one Side upon the true Point of East, and with the other upon the Point of South-west, or West-south-west : Whence you see its Middle declined about 15 Deg. from South to East, and was diametrically opposed to the Middle of the *Aurora Borealis*. Its Altitude did vary a little, but never reached higher than the Head of *Orion*, which was 54 Deg. high, and never was seen lower than a little under *Procyon*, which is an Altitude of 45 or 46 Deg. The inferior Arch was exactly parallel to the superior, and the Breadth of the Zone varied from 14 or 15 Deg. to 18 or 20 Deg.

The Colour of this Zone was Red, Scarlet, inclined to Purple, pretty lively and changeable by Intervals. It was less vivid near the Horizon, and also to the Meridian, where it seemed now and then interrupted. Some Standers by did imagine two great Arches rising, one

one from the East, the other from the South-east, and meeting together near the Meridian, but immediately afterwards parting one with another, and drawing back, which they repeated very often.

Under this Zone then was to be seen, but not constantly, one or two Arches lucid and interrupted, which comprehended with the Horizon a dark Segment very like a Mist.

The Phænomenon did last till Four o' Clock in the Morning. The Weather was calm, serene, and cold, the Barometer very high; no Cloud in the Heaven.

It was remarkable, and I think extraordinary, that this *Aurora* considerably darkened the Light of those Stars which were seen through it; and that was much more true of the red meridional Zone, which dyed with its reddish Colour the Stars that appeared behind. When that Zone was the highest, it covered *Jupiter*; and some Gentlemen, which at that Time had not yet remarked the *Aurora*, looking at *Jupiter* through a Telescope, affirm they could hardly see it, but that it seemed as intercepted by some dark Cloud; and indeed it looked at that Time as if it had been seen through a red Glass.

This Observation confirms what is moreover very probable, that this Zone was produced by the Light of the opposite *Aurora*, either by Reflexion or Refraction. But the Manner of its Production seems difficult to be accounted for. There may be supposed Icy Particles swimming in the Air, and of such Figure as to exhibit a great Zone, by the Reflexion and Refraction of the Light of the *Aurora*, almost in the same Manner as the Drops of Rain produce the Appearance of the Rainbow. But this being meer Conjecture, I shall pass it over.

The *Aurora* and *Zone* seemed a great deal nearer one another in the Horizon than in the Top. If we could suppose this Difference to be entirely Optick, and these two Circles really Parallels, that would be enough to compute the Distance of the Phænomenon from the Earth. But the Supposition, though it seemed, at first, pretty allowable, is by no means to be admitted; for it would follow, that the Phænomenon was at least distant from us one twenty-fourth Part of the Diameter of the Earth, which is too great an Altitude to be believed.

I have seen lately another Phænomenon of a quite different Kind. A Friend of mine having caused some Pipes of Ash-tree Wood (that brought Water to his Fountain during at least twelve Years) to be taken out of the Earth, they were left in a Yard not paved, where they rotted almost entirely: But in their room there did shoot forth from the Earth, a little Forest of Ash-trees. They are now in a flourishing Way, and about 3 or 4 Foot high. It is remarkable, that more than fifty young Trees are sprung up exactly where the Pipes had been laid, and no where else in the Yard. There is no Ash-tree there about, nor perhaps at a very great Distance, the Yard being in the Town.

I am, with great Esteem and Respect,

Geneva, Febr. the 20th,
1730, N. S.

*Your most humble,
and most obliged Servant,*

G. C R A M E R.

VIII. *An*